

cause there is more of it." Pauline Borghese (Napoleon's sister), who posed for the statue, would have smiled at this tribute. The Theseion at Athens is too small for him and only the Pyramids come up to his expectations. In Florence, however, he notices a misplaced inguinal artery in a wax preparation, and goes straight to the correct inference, *viz.*, that since the time when the great Quattrocento painters practised dissection, anatomical teaching at Florence seems to have been concentrated mainly on the muscles. The most interesting thing in Mott's book is his account of the petrified pathological preparations of the Florentine Sigato. This Signor Sigato, it seems, had acquired in the far East a secret process of petrifying animal substances, so that pathological preparations, thus hardened, could be sawed into slabs, susceptible of a high polish, preserving at the same time the most delicate details of structure and color, even to the bloodvessels. Mott describes a table-top, a mosaic of squares, showing perfect cross-sections of a phthisical lung, hydatids of the liver, renal calculus and cardiac lesions. The petrified solid specimens could be thrown about in the roughest way without damage. Mott tried to employ Sigato, who was heavily in debt, but the unfortunate Florentine died three weeks later and his wonderful secret died with him. If it could be rediscovered, what wonderful archives in polished stone would be conveyed to posterity by pathologists and cross-section anatomists!

F. H. GARRISON

THE APPLICATION OF NEWER METHODS IN BLOOD-CHEMISTRY TO CLINICAL MEDICINE

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(Delivered before the New York Academy of Medicine, May 21st, 1925.)

The blood together with the lymph provides a vehicle for the chemical correlation of the cells of the body. Any changed condition in the tissue fluids will be promptly reflected in its composition and conversely any change in the basic constituents of

the blood will affect the composition of the tissue fluid and hence of the tissue juice within the cells. Disturbances in the function of the organs of elimination as well as abnormalities in the intermediary metabolism of the body will affect the composition of the blood.

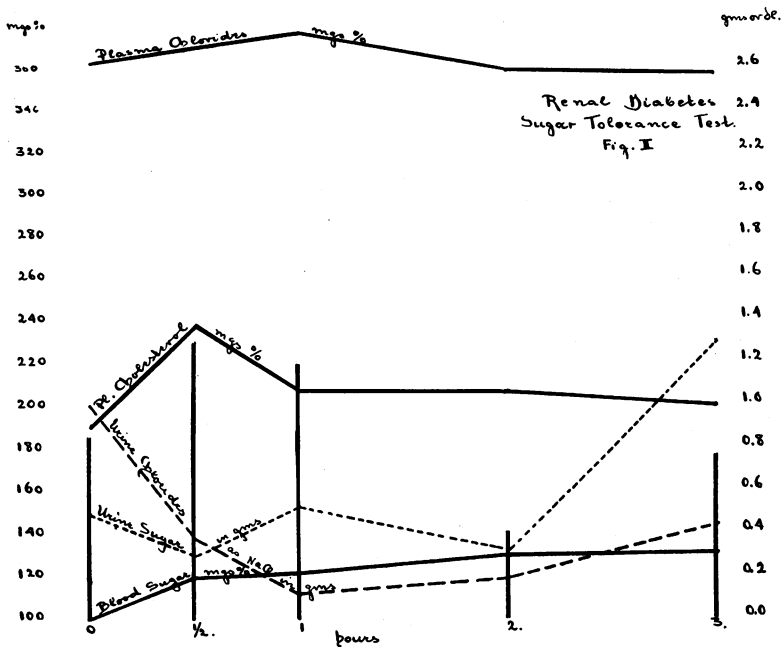
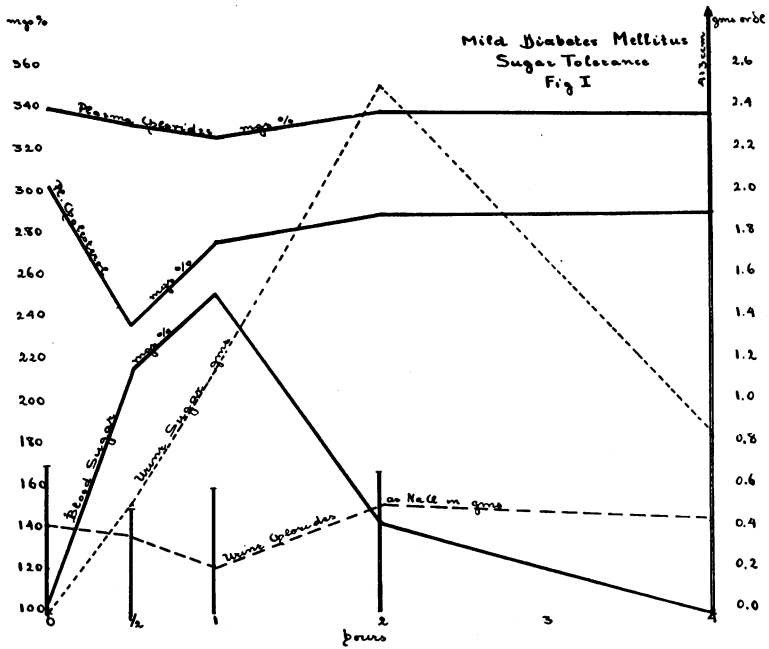
The composition of the blood is also materially affected by the ingestion of food and the intensity of the catabolic processes. While the concentration of certain basic components such as water, inorganic salts and proteins is affected to only a slight extent, the concentration of food substances being conveyed to the tissues as well as the concentration of waste material varies within wider limits and for a greater period of time. It follows that for very exact work a diet of standard chemical composition for a few days preceding the blood test is necessary, for clinical work it suffices to obtain the sample from the subject in a morning fasting condition. For a determination of the basic constituents which are only transitorily affected by food ingestion a three hour interval between food intake and securing of blood sample is sufficient. About 80 per cent. of the blood is water. Various gases, inorganic salts and organic compounds are held in true solution. The more complex organic compounds, such as proteins, higher carbohydrates, lipoids, etc., are held in colloidal solution, while fats, especially shortly after absorption, are present in finely emulsified form. Structurally the blood is a suspension of cellular elements in this heterogenous solution, the plasma. The components of the blood, most of which are present in minute concentrations, are unequally distributed between the corpuscles and the plasm. Certain organic as well as inorganic components do not penetrate the erythrocytes or if so only in extremely small proportion. Fatty acids and lipoids as well as the plasma proteins are also adsorbed to a certain extent on the surface of the erythrocytes. It is best to employ plasma rather than whole blood for the quantitative determination of its constituents, except for those components which are present in nearly equal or even greater concentration in the corpuscles than in the plasma. Many of the blood constituents of clinical importance are present in minute concentrations and the need of pre-

cautionary measures to avoid contamination by foreign substances must be realized. When the blood is obtained from the subject not in a morning fasting condition but after a three hour fast the time when the last meal had been completed and the amount of food taken expressed in gms of carbohydrate, protein and fat should be noted. To insure that the Luer syringe as well as the needle employed are chemically clean and sterile, the syringe must be washed with tap water, followed by two rinsings with distilled water and dried over night at a temperature of 110° Cent. The needles may be dried with alcohol and ether. Sterilization by boiling in tap water does not insure a chemically clean apparatus and causes errors not only in the calcium determination but also in other analyses of the blood. Before delivering the drawn blood into a chemically clean and sterile glass flask, containing a measured amount of anticoagulant, the needle should be detached to avoid damage to the blood corpuscles.

The use of Sodium citrate as anticoagulant does not interfere with the determination of plasma Calcium, nor does it render the determination of plasma Fibrinogen more difficult, as is the case when oxalate is used. The employment of Sodium citrate as anticoagulant is entirely satisfactory only if it has been recrystallized, finely ground in a steel or agate mortar, and introduced into the flask in a dry state. Introduction of the citrate in solution and allowing it to dry causes the formation of larger crystals which dissolve too slowly when the blood is added. The minimum amount of Sodium citrate which will prevent coagulation is 4 mgs per ccm of blood, the maximum amount which may be used without danger of causing hemolysis or affecting certain determinations is 10 mgs per ccm of blood. For clinical work it is best to keep within the limits of 4 to 8 mgs per ccm of blood. For research work a constant proportion must be maintained.

While determinations of a single component are often of clinical value in following a case, a more complete picture is obtained by a coincident analysis for the concentration of other elements, and the diagnostic value of the quantitative analysis may thereby be enhanced.

Such analyses have been made for a number of years and the determinations shown in the following tables were chosen as rep-



representative from a great number of cases. Table I gives the determinations of the Blood Sugar, Plasma Calcium, Chlorides and Cholesterol and the Serum Proteins in Glucosuria, *i.e.*, uncomplicated Diabetes Mellitus, Diabetes Mellitus with complications and the so-called Renal Diabetes. On the first line of the table the limits of normal concentrations are shown. It is interesting to observe that while the Plasma Calcium in uncomplicated Diabetes Mellitus is at the high normal level, if not actually increased, in the cases complicated by Arterio sclerosis and Myocardial insufficiency it is almost always at the low normal level or decreased below the normal concentration. In renal diabetes the Calcium concentration remains within the normal limits. The chlorides in true Diabetes Mellitus are usually decreased below the normal level while in the renal diabetic cases they are increased above the normal limit or at least a high normal. One case of renal diabetes was put on a salt free diet. The chloride concentration became normal and the calcium, which had always been within the normal limits increased slightly above the normal. The concentration of the sugar in the urine decreased from an average of 2 per cent. with a blood sugar of 100 mgs per cent. to an average of 0.8 per cent. with the same blood sugar concentration. The volume output remained the same and the decrease in percentage cannot be ascribed to greater dilution. The concentrations of the Serum Proteins are high in Diabetes Mellitus and in Renal diabetes, especially the Albumen fraction. Coincident with the decrease in the Calcium concentration in the complications mentioned the Albumen fraction is also found decreased. The Cholesterol in true diabetes is usually increased in Renal Diabetes it is normal.

The changes in the concentrations of Blood Sugar, Chlorides and Cholesterol as well as the excretion of Sugar and Chlorides in the Urine have been followed during Sugar Tolerance tests on true diabetics and renal diabetics. Figure I shows the typical curves of mild diabetes mellitus, figure II those of renal diabetes. The curves have been selected as characteristic from a total of twenty cases.

Aside from the characteristic and well known difference in the blood sugar curve, there is also a difference in the cholesterol and

in the chloride curve. In cases of diabetes mellitus there is usually a slight drop in the chlorides and a drop in the cholesterol 30 minutes after glucose ingestion. The true renal diabetic at 30 minutes post glucose ingestion shows a decided rise in cholesterol and a slight rise in the plasma chlorides, resembling the normal but in a more accentuated form. The curves of sugar excretion of these types also varies. In true diabetes mellitus the curve reaches its peak shortly after the blood sugar curve has passed its peak and at the fourth hour the excretion is materially decreased. In renal diabetes the peak of the sugar excretion is not likely to be reached or passed within the period of the experiment. The chloride excretion curves do not differ materially. The volume output also differs. It is delayed in diabetes mellitus while in renal diabetes the fluid taken is excreted to a great extent in the early period of the experiment. The vertical lines in Figs. I and II indicate the volume output. There was no change observable in the concentration of Calcium or Serum proteins other than that accounted for by a very slight change in cell volume. This observed change of fluid to cell mass in the blood was however not sufficiently great to account for the changes in the chloride and cholesterol concentration.

The cases of impaired kidney function (Table II) may be divided into two main groups: the azotaemic type and the hydraemic type.

In the azotaemic type the serum proteins are a low normal or slightly decreased. There is no consistent decrease in the calcium concentration nor increase in the chloride concentration. The fibrinogen is slightly increased. Subjective symptoms and clinical examination frequently lead to the presumption of the existence of a focus of infection in the absence of focal symptoms. In such cases the determination of cholesterol and fibrinogen as well as the sedimentation rate is of considerable clinical value especially if interval analyses are made. With azotaemia there is always a reduction in the concentration of the urine uric acid excretion which may be compensated for by an increase in the volume output, without a marked or consistent uricacidemia.

The simultaneous determination of uric acid in the blood and urine as well as the determination of the urine uric acid excreted

during twenty-four hours is of value not only in cases of renal insufficiency but also in uricacidemia without retention of other nitrogenous metabolites. The kidneys in health concentrate uric acid approximately twenty times but concentration as high as sixty times may occur. An excess supply of uric acid of endogenous or exogenous origin may raise the blood uric acid concentration even in the absence of renal insufficiency. Again, with a limited supply of uric acid and an increased volume output its content in the blood may not be raised beyond the high normal level despite a decreased ability of the kidneys to concentrate it. The two factors, production of uric acid in the tissues and possible destruction in the blood or special organs, on the one hand, and excretion by the kidneys, on the other hand, are quite unrelated.

If the blood and urine specimen are obtained from the subject, one hour after the first voiding and in a morning fasting condition, which includes fasting from water, the ratio "mgs per cent. Urine Uric Acid / mgs per cent. Blood Uric Acid" will normally lie between 20 to 35. The ratio "mgs Uric Acid in 24 hrs. / mgs per cent. Blood Uric Acid" on a purine free diet for a healthy individual is 250 to 350. In mild kidney deficiency the single specimen ratio will always be low, while the twenty-four hour ratio, due to an increased volume output may be normal, and the blood uric acid not increased above the high normal level.

The hydraemic type may again be divided into two groups. "A" The chloride content of the blood is materially increased while the serum proteins are not reduced or only very slightly so. "B" The chloride concentration is normal or only slightly increased but the concentration of the Se. proteins, especially the albumen fraction, is very much lowered. The calcium concentration is below normal and the fibrinogen and cholesterol are very much increased. Determinations on this type are shown in table II. In this group of cases there is decided retention of water in the tissues and this is due to a defective osmotic-filter apparatus, that is reduction of serum protein concentration, which may be followed or accompanied by a slight chloride retention. The nitrogenous waste products are not increased, or

only slightly so, the alkali reserve, the pH and the inorganic phosphorus are normal or only very slightly changed. The usual tests for renal function, except water and NaCl elimination, are normal or only slightly subnormal. The cell volume of the blood is usually not reduced. The reduction in the Se. proteins occurs to the largest extent in the albumen fraction and the ratio "Albumen/Globulin" is therefore materially decreased. A ratio below 1 is often encountered; a ratio below 0.5 indicates a severe condition. The fractionational precipitation of the proteins must be carried out immediately after the sample has been obtained. If the blood or plasma is allowed to stand, especially if exposed to sunlight or if an excess of anticoagulant has been used, a change in the solubility of the albumen fraction may occur which causes a reduction in its concentration and an increase in the concentration of the globulin fraction.

The decrease in the calcium conc. runs parallel to the decrease in the albumen conc. The rise in the fibrinogen and cholesterol recalls the increase in these substances observed in chronic infections. Coincidentally the sedimentation rate is very much increased. Improvement in the condition is reflected by a decrease in the sedimentation rate and repeated estimations of the rate in such cases, as in cases of infectious diseases, *e.g.*, T. B., furnishes a guide, other things being equal, of the progress or retrogression of the disease.

Blood chemistry determinations in the toxemias of pregnancy are shown in table III. The average typical concentrations which obtain during the course of a normal pregnancy are shown as well as blood chemistry estimations representative of the four types of Toxemias.

In normal pregnancy there is a steady increase in the cholesterol and fibrinogen conc. progressively during the pregnant term. There is a reduction in the cell vol. and this reduction may account for the slight decrease in plasm Ca. concentration towards the termination of the pregnancy. The chloride concentration in normal pregnancy is increased above the normal during the later months. There is a slight reduction in the Se. proteins but the ratio Alb./Glob. remains normal.

The Toxemias may be divided into four groups: "A" Vomiting of pregnancy, "B" Toxemia with retention, "C" Toxemia with uricacidemia, "D" Eclampsia.

"A." Depending upon the severity of the vomiting the chloride content of the blood may be increased if the loss of fluid is relatively greater than the loss of HCl from the stomach, or decreased if the reverse is the case, a secondary factor being the degree of chloride storage in the tissues. Slight acidosis is often present. The normal increase in cholesterol in pregnancy is absent and in the severer cases the cholesterol is decreased below the concentration normal for non-pregnant women. Long continued vomiting (pernicious) may result in an accumulation of nitrogenous waste products in the blood.

"B." In this group there is definite retention of non-protein nitrogen, urea, uric acid and occasionally creatinine. The fibrinogen shows the usual increase during pregnancy, it may be slightly accentuated. The increase in cholesterol is normal. The uric acid ratio is of the retention type. That is to say, the blood uric acid may be increased or merely high normal with a lowering of the per cent. excretion of the uric acid in the urine.

"C." This type of cases have definite uricacidemia but no other nitrogen retention. The fibrinogen is increased above the rise in concentration usually present during pregnancy. The cholesterol may be far above the normal pregnancy cholesterol level. The icterus index may be increased above the index normal to pregnancy and the Van der Bergh test for bile acids may show the presence of bilirubin in a concentration greater than 0.5 mgs per cent. The urine uric acid to blood uric acid ratios show that the kidney potential for concentration of uric acid is either not at all or only slightly impaired and that the high blood uric acid is not due to a decrease in the excretion of uric acid by the kidneys below the normal concentration.

"D." In eclampsia there may be a moderate azotaemia but the uric acid is the only nitrogenous metabolite that is ever excessively increased. The calcium concentration is decreased, the chloride concentration is usually low but sometimes normal. The cholesterol may be increased or be normal for the period of

gestation. If the concentration of the calcium and the chlorides are expressed in millimols the product of the calcium concentration and the square of the chloride concentration is a constant within narrow limits in health as well as in many pathological conditions. This constant is reduced in acidosis, diabetic coma, uremia and eclampsia; in fact in all conditions involving a change in the reaction of the blood. The degree to which this constant varies from the normal seems to indicate the degree of acidosis present.

The determination of fibrinogen and of cholesterol as well as the sedimentation rate is of value in cases of proven or of suspected infection in which there are no definite or general focal symptoms. In acute infections the fibrinogen is high and the cholesterol at first is low. The defensive mechanism of the body seems to involve a rise in the cholesterol concentration and in chronic infections which are being actively combatted by the body the cholesterol is always increased above the normal. In certain infections, *e.g.*, tuberculosis, the calcium concentration is decreased below the normal. In furunculosis there is usually a definite decrease in the cholesterol concentration.

In diseases of the skin the estimation of the uric acid, sugar, calcium and cholesterol may be of clinical assistance. In urticaria, angio-neurotic edema and dermatitis the calcium is usually decreased below the normal, in acne its concentration remains at the high normal level.

In gout the blood uric acid is more or less increased, but its deviation from the normal level is not as marked as is the decrease in the urinary concentration of uric acid, especially just preceding an acute attack. The fibrinogen is considerably increased. The calcium is usually slightly decreased but increases above the normal just preceding an acute attack have been found.

The sedimentation rate is increased in many pathological conditions, and by itself is therefor not of much diagnostic value. The fibrinogen is not the only substance which by its increased concentration causes an accelerated rate. The globulin frac-

tion, cell volume, viscosity and the pH as well as a certain unknown factor which causes a decrease in the sedimentation rate also play a part in determining the rate at which agglutination and sedimentation take place. Many instances of "reduced sedimentation rates" with normal cell volumes, normal protein concentrations and even increased fibrinogen have been encountered. In most of these cases indicanuria was present and the feces examination in some was said to show a high histamine content. It is possible that the unknown factor which decreases the rate of sedimentation may prove to be the presence of an increased amount of an anti-agglutinating substance in the blood. Such chemical bodies are found among the products of protein putrefaction and at least one, histamine, is known to lower the coagulability of the blood.

The cell volume estimation is a valuable aid in the proper interpretation of the blood chemistry figures; in fact in certain cases determination of the water content may also prove advisable. In the methods that are commonly used for the estimation of substances in the protein free filtrate the volume occupied by the precipitate is not taken into account and the filtrate is considered as though occupying the volume of the original precipitation mixture. This introduces an error which may be disregarded as long as the variations in cell volume remain within the normal limits, since the values are comparable. If the cell volume and hence the precipitate are much reduced the error inherent to this method is also reduced and conversely if the cell volume is increased the error is increased. Ten ccm. of the filtrate obtained by the Folin and Wu precipitation method from a blood with a cell volume of 50 per cent. will contain the soluble substances present in about 1.67 ccm. of blood and not 1 ccm. as is assumed in the calculation. Conversely if the cell volume is much reduced, let us say to 22 per cent., ten ccm. of such a filtrate will contain the soluble substances present in approximately 1.25 ccm. of blood. The smaller the so-called dry volume, *i.e.*, the precipitate, the closer the approach to the theoretical value. Adsorption of the soluble substances on the protein pre-

precipitate is indeterminate but in any case could never compensate for the above mentioned source of error. The variations in the cell volume usually encountered are not sufficiently large to affect the comparative values; but the influence of a reduced cell volume and hydraemia on the final results of the analyses should be taken into account. Thus the often mentioned low urea and sugar concentration in pregnancy may be attributed in part at least to this effect.

The determination of viscosity and surface tension are physico-chemical measurements which may prove of value.

Ionic antagonism is a phenomenon of great importance in life processes and the determination of the other cations present, aside of calcium, should be undertaken. The concentration of resorbed intestinal toxins as well as the enzymatic activities taking place in the blood stream, are subjects which also may prove worthy of future investigation.

Supplemented by Urine chemistry, by the chemistry of the Respiration and by Metabolic Rate estimation, blood chemistry offers the best means of investigating the status of the chemical equilibrium of a living organism and chemically correct and critically interpreted blood analyses will be found to have a wide and valuable clinical application.

TABLE I
BLOOD CHEMISTRY IN GLUCOSURIA

| | BL. | | | PLASMA | | | SERUM | | | Urine Sugar at time of blood | |
|-----------------------------|-----------------|-------------------|---------------|---------------|-----------------|----------------|-----------|------------|-----------|--|----------------------|
| | Sugar mgs. % | Cell vol. % | Ca. mgs. % | Cl. mgs. % | Chol. mgs. % | Fib. mgs. % | Alb. % | Glob. % | Tot. % | | Ratio Alb. Gl. |
| Low Normal | 80 | 42.0 | 9.8 | 355 | 150 | 250 | 4.8 | 1.8 | 6.6 | 2.8 | ..... |
| High Normal | 100 | 48.0 | 10.3 | 365 | 165 | 325 | 5.5 | 2.6 | 8.1 | 1.8 | ..... |
| <i>Diabetes Mellitus</i> | | | | | | | | | | | |
| No. 2608 | 384 | 55.3 | 10.4 | 350 | 250 | 400 | 5.30 | 2.98 | 8.28 | 1.8 | xxxx |
| No. 2361 | 125 | 37.5 | 10.6 | 343 | 240 | ..... | 5.64 | 1.58 | 7.22 | 3.5 | 0 |
| No. 2144 | 333 | 43.6 | 10.1 | 331 | 220 | 340 | 4.71 | 1.83 | 6.54 | 2.6 | 0.8% |
| " " | 138 | 46.0 | 10.4 | 335 | 210 | ..... | 4.78 | 1.73 | 6.51 | 2.8 | 0 |
| No. 1675 | 268 | 35.0 | 10.2 | 344 | ..... | 455 | 4.69 | 2.37 | 7.06 | 2.0 | xxxx |
| " " | 200 | 35.1 | 10.1 | 327 | 344 | ..... | 4.56 | 2.12 | 6.68 | 2.1 | 0 |
| " " | 510 | 36.1 | 9.6 | 318 | 345 | 383 | 4.08 | 2.75 | 6.83 | 1.5 | 4.0% |
| No. 2291 | 182 | 37.7 | 9.7 | 350 | 228 | 455 | 5.22 | 2.45 | 7.67 | 2.1 | tr. |
| No. 2529 | 196 | 35.0 | 8.8 | 318 | 269 | 278 | 3.40 | 1.83 | 5.23 | 1.9 | x |
| No. 2006 | 174 | 31.8 | 9.4 | 350 | ..... | ..... | ..... | ..... | ..... | ..... | tr. |
| No. 2348 | 210 | 40.0 | 9.5 | 346 | 232 | 555 | 3.80 | 1.40 | 5.20 | 2.7 | x |
| No. 2534 | 222 | 39.5 | 11.1 | 340 | 166 | 590 | 4.70 | 2.37 | 7.07 | 2.0 | xxx |
| No. 2566 | 174 | 45.0 | 10.6 | 350 | ..... | 288 | 4.15 | 1.40 | 5.55 | 2.9 | 0 |
| Marg. | 149 | 45.3 | 10.7 | 360 | 180 | ..... | 4.35 | 2.60 | 6.95 | 1.7 | 0 |
| <i>Renal</i> | | | | | | | | | | | |
| No. 2595 | 80 | 48.5 | 10.3 | 361 | 156 | 278 | 5.93 | 1.58 | 7.51 | 3.8 | 0.95% |
| No. 2312 | 103 | 43.2 | 10.3 | 365 | 228 | 346 | 5.50 | 1.94 | 7.44 | 2.8 | 2.00% |
| " " | 108 | 41.5 | 11.5 | 350 | 160 | ..... | 6.00 | 2.04 | 8.04 | 2.9 | 0.80% |
| " " | 100 | 40.7 | 10.0 | 383 | ..... | ..... | 5.50 | 1.84 | 7.34 | 3.0 | 2.00% |
| No. 2584 | 133 | 46.5 | 10.7 | 372 | 155 | ..... | 5.80 | 1.60 | 7.40 | 3.6 | 0.70% |
| No. 2269 | 87 | 42.5 | 9.8 | 360 | 150 | 245 | 5.00 | 2.18 | 7.18 | 2.3 | x |
| CO ₂ 25.5 vol. % | | | | | | | | | | | |
| Art. scler. | | | | | | | | | | | |
| Myocard. Art. sel. | | | | | | | | | | | |
| Myocard. Art. sel. | | | | | | | | | | | |
| Myocard. Ins. T. B. | | | | | | | | | | | |
| Gangrene | | | | | | | | | | | |
| Albuminuria | | | | | | | | | | | |
| Retinal Hem. | | | | | | | | | | | |
| SALT FREE DIET | | | | | | | | | | | |
| DIET DISCONTINUED | | | | | | | | | | | |

CO₂ 25.5 vol. %

Art. scler.

Myocard. Art. scl.

Myocard. Art. scl.

Myocard. Ins. T. B.

Gangrene

Albuminuria

Retinal Hem.

SALT FREE DIET

DIET DISCONTINUED

TABLE II
BLOOD CHEMISTRY IN IMPAIRED KIDNEY FUNCTION

| | Cell vol. % | BLOOD | | | PLASMA | | | SERUM | | | Total Prot. Alb./Glob. % | Ratio |
|------------------|-------------------|-----------------|-----------------------|-----------------|--------------|--------------|----------------|----------------|-----------|------------|--------------------------------|-------|
| | | N.P.N. mgs.% | Uric Acid mgs.% | Great. mgs.% | Ca. mgs.% | Cl. mgs.% | Chol. mgs.% | Fibr. mgs.% | Alb. % | Glob. % | | |
| Low Normal | 42.0 | 25.0 | 1.5 | 1.3 | 9.8 | 355 | 150 | 250 | 4.80 | 1.80 | 6.60 | 2.8 |
| High Normal | 48.0 | 35.0 | 2.5 | 1.7 | 10.3 | 365 | 165 | 325 | 5.50 | 2.60 | 8.10 | 1.8 |
| <i>Azotemic</i> | | | | | | | | | | | | |
| No. 06176 | 31.5 | 43.7 | 2.8 | ..... | 8.7 | 367 | ..... | 578 | 2.78 | 1.92 | 4.70 | 1.5 |
| Dol. | 41.0 | 45.2 | 4.6 | 1.8 | 9.7 | 365 | 200 | 238 | ..... | ..... | ..... | ..... |
| No. 7298 | 34.7 | 47.0 | 3.6 | 3.0 | 9.0 | 373 | 357 | 532 | 3.07 | 2.49 | 5.56 | 1.2 |
| Stan. | 36.0 | 53.0 | 4.8 | 2.4 | 10.2 | 365 | 175 | 465 | 4.20 | 2.20 | 6.40 | 1.9 |
| Orl. | 30.0 | 80.0 | 5.0 | 5.4 | ..... | ..... | ..... | 530 | 3.17 | 3.03 | 6.20 | 1.0 |
| No. 2563 | 21.0 | 123.0 | 5.7 | 4.3 | 10.2 | 386 | 225 | 447 | 4.08 | 2.45 | 6.53 | 1.6 |
| No. 73816 | 27.0 | 158.0 | 5.4 | 4.9 | 11.1 | 361 | 139 | 500 | 5.08 | 3.52 | 8.60 | 1.4 |
| <i>Hydraemic</i> | | | | | | | | | | | | |
| No. 2616 | 42.0 | 35.5 | 1.5 | ..... | 8.1 | 413 | 417 | 520 | 1.87 | 2.04 | 3.91 | 0.9 |
| Fol. | 25.8 | ..... | ..... | ..... | 8.3 | 360 | 251 | 655 | 1.58 | 4.37 | 5.92 | 0.4 |
| No. 2420 | 26.7 | ..... | ..... | 2.0 | 10.0 | ..... | 150 | 853 | 3.36 | 4.20 | 7.56 | 0.8 |
| No. 2465 | 33.0 | 34.8 | 2.5 | ..... | 8.7 | 360 | 425 | 1000 | 1.46 | 1.34 | 2.80 | 1.1 |
| " | 44.0 | ..... | ..... | ..... | 9.2 | ..... | 400 | 770 | 2.34 | 1.33 | 3.56 | 1.8 |
| " | 44.0 | 38.0 | 3.6 | ..... | 8.9 | 381 | 491 | 590 | 2.07 | 1.05 | 3.12 | 2.0 |
| " | 40.1 | 41.5 | 2.0 | ..... | 7.6 | 380 | 278 | 650 | 2.18 | 2.12 | 4.30 | 1.0 |

Albuminuria

TABLE III—(Continued)

| | BLOOD | | | | PLASMA | | SERUM | | | Total Ratio Prot. Alb./Glob. | | | |
|---------------------|-------------------|-----------------|-----------------------|-----------------|---------------|--------------|--------------|----------------|----------------|---------------------------------|-----------|------------|------------------------------|
| | Cell vol. % | N.P.N. mgs.% | Uric Acid mgs.% | Creat. mgs.% | Sug. mgs.% | Ca. mgs.% | Cl. mgs.% | Chol. mgs.% | Fibr. mgs.% | | Alb. % | Glob. % | |
| <i>Uricacidemic</i> | | | | | | | | | | | | | |
| Ros. 6 ms. | 33.6 | 29.6 | 6.7 | ..... | ..... | 9.9 | 363 | 330 | 650 | ..... | ..... | ..... | ..... |
| H.N. 5 ms. | 33.5 | 20.0 | 6.9 | 1.3 | ..... | 8.7 | 360 | 210 | 382 | ..... | ..... | ..... | ..... |
| Orl. 4 ms. | 48.0 | 34.8 | 4.7 | ..... | ..... | 10.0 | ..... | 433 | 440 | 3.15 | 1.28 | 4.43 | 2.1 |
| Hai. 7 ms. | 43.5 | 32.2 | 3.8 | ..... | ..... | ..... | ..... | 351 | 753 | ..... | ..... | ..... | ..... |
| Pet. 5 ms. | 33.3 | 41.0 | 11.4 | ..... | ..... | 8.2 | 322 | 185 | 905 | 3.43 | 4.57 | 8.00 | 0.8 |
| <i>Eclampsia</i> | | | | | | | | | | | | | |
| Wal. 9 ms. | 29.0 | 34.6 | 5.5 | ..... | ..... | 8.8 | 370 | ..... | 553 | ..... | ..... | ..... | ..... |
| Bat. 8 ms. | 33.0 | 37.0 | 7.7 | 1.2 | ..... | 9.3 | 362 | 210 | 519 | ..... | ..... | ..... | ..... |
| Rya. 8 ms. | 34.0 | 32.4 | 8.7 | ..... | ..... | 8.8 | 346 | 260 | 343 | ..... | ..... | ..... | ..... |
| Mo. 9 ms. | 41.0 | 44.8 | 5.8 | 1.2 | ..... | 9.2 | 318 | 368 | 420 | ..... | ..... | ..... | ..... |
| Ag. post. | 26.0 | 93.3 | 9.1 | 3.9 | ..... | 9.3 | 319 | 204 | 705 | ..... | ..... | ..... | ..... |
| “ | 33.0 | 32.7 | 3.5 | 1.5 | ..... | 11.0 | 355 | ..... | 430 | ..... | ..... | ..... | ..... |
| | | | | | | | | | | | | | Post part. One week later |